



STATE OF UTAH
DEPARTMENT OF HEALTH

NORMAN H. BANGERTE, GOVERNOR

SUZANNE DANDOO, M.D., M.P.H., EXECUTIVE DIRECTOR

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C.C. J. Whitehead

July 23, 1986
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RECEIVED

JUL 30 1986

DIVISION OF OIL
GAS & MINING

Mr. Melvin R. Swanson
P.O. Box 1383
Moab, Utah 84523

RE: Kelmine Corp. Lisbon Valley Mine
Process Plan Review

Dear Mr. Swanson:

After reviewing your 14 April 1986 submittal in response to our 10 February 1986 letter and per our phone conversation of 28 May 1986, we find that the following information needs to be submitted for review:

1. The 9 June 1986 letter must become part of the approval document and should be listed as Addendum No. 1 because of the modifications to the design that are contained therein. Hereafter, all response letters which are written that contain design change or additional design information must become part of the approved contract document and be listed as a subsequent addendum.
2. The clay leak detection liners below all synthetic liners should be a minimum of 2 feet thick.
3. An operations plan for the leak detection system, acid tank spillage containment facility and spillage containment pond should be provided for review.
4. Clay leak detection liners and the emergency spillage pond clay liner should be laid in a minimum of three (3) lifts for a two (2) foot liner thickness.
5. It is recommended that the leak detection system for all process ponds be modified to have a perforated collection line around the entire perimeter of the flat bottom, and also, two perforated lines equally spaced, running the length of each pond.

6. Details of all sulfide leach pads proposed for this project must be shown.
7. The permeability rate for the material which will be used to construct the phase I leach pad should be provided.
8. The permeability test, which was conducted for the Deery oil liner, does not provide an adequate basis for evaluation. Measurable test results for permeability must be provided.
9. The capability of all clay leak detection liners and the emergency spillage pond clay liner to withstand long periods of exposure to the pregnant liquor must be established. The following tests are recommended to adequately establish this property of the clay.
 - a. The standard tests for the liquid limit and the plastic limit of the clay should be run with distilled water and with the pregnant liquor solution. After the tests are completed, a comparison should be made to determine if there are any significant differences in the results of these tests.
 - b. In addition, a standard constant head permeability test with the pregnant liquor solution should be run and the results submitted for review. As a matter of clarification the constant head permeability tests referred to here may take 6 to 12 weeks to run, depending on the type of clay being tested.
10. The construction limits for leak detection clay liners and the emergency spillage pond clay liner which will be constructed including field density, gradation, permeability, and thickness verification, should be included in the plans and specifications. A minimal recommendation for the number of these tests which should be run is as follows:

<u>Test</u>	<u>Number of Tests</u>	<u>Grid Size Per Lift</u>
Atterburg Limits	1	100 Ft. X 100 Ft.
Gradation	1	100 Ft. X 100 Ft.
Compaction	1	25 Ft. X 25 Ft.
Permeability	1	150 Ft. X 200 Ft.
Thickness Verification	1	100 Ft. X 100 Ft.

The results of these tests should be summarized and submitted to the Bureau of Water Pollution Control for review once completed.

11. The recommendations presented in the 4 March 1986 letter from Steffen, Robertson and Kirsten, Consulting Engineers, to produce a liner with the lowest possible permeability rate should be indicated as requirements for clay liner construction. It is also our understanding that a compaction test must be run to establish the optimum moisture content. This test must be run to establish the optimum moisture content and then the acceptable range must be required in the specifications.
12. Drawing 6277-1004-00-0, which shows cross sections of the process ponds and iron-aluminum ponds, must have adequate ditch capacity to divert surface run off waters around the ponds. Also, the ultimate disposition of the surface run off water should be shown.
13. The emergency spillage containment pond calculations, page A-63, show that wave action, etc., will utilize 90% of the 2.0 feet of freeboard. A minimum of 3.0 feet of freeboard should be specified.
14. The 9 June 1986 letter of response indicates in concern No. 17 that "...other ponds certain neutral non hazardous products and their contents would be temporarily stored in the emergency containment pond and/or other process ponds." Utilization of the process ponds for various functions is at the discretion of the operator. However, the emergency spillage containment pond should be used only for its design function. Please state what provision will be available to draw down the ammonium sulfate and iron aluminum ponds should a leak develop.
15. The berm elevations for the ammonium sulfate and iron aluminum ponds should be indicated on drawing 6277-1003-00-0, or some other means provided so the capacity of these ponds can be evaluated.
16. The plan of operation should state that once the leaching operations have been completed, and after neutralization, the pile should be allowed to drain. Then the liquid from the leach operation should be pumped out, and this process repeated until all free draining liquid has been removed from the pile. Once this has been completed and the surface graded and reclaimed, the pile can be abandoned.
17. The design for the containment of spillage and storm events in the ore pretreatment area assumes, on page A-50, that the maximum solution level will be at elevation 6551.75 feet, and the lowest elevation of the containment berm is at elevation 6552.00 feet. This would allow only 0.25 feet of freeboard, which is insufficient considering within a short period of time the dikes will be saturated, and also, wave action from a storm will almost surely cause these waters to pass over the dike. A minimum freeboard of 2 feet should be provided.

Melvin R. Swanson
Moab, Utah
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18. No synthetic liner is proposed for the emergency spillage pond due to the limited exposure of the (2) two foot clay liner to the acid. An operations procedure for the emergency spillage pond must be provided so this exposure time can be evaluated.

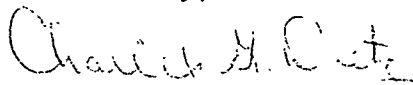
It has been our experience that any synthetic liner over a large enough area will allow a certain amount of liquid to seep through. This is a major concern to the Bureau for two (2) reasons:

- a. A certain amount of liquid may appear in the leak detection system, when in fact there has been no failure of the liner system. For this project, as will be stated in the construction permit, a leak will be defined as water found in the leak detection system whose quality, upon analysis, shows constituents which are in the liquids contained by the liner. Also, that the quantity of water found in the leak detection system exceeds the amount which could reasonably be expected to seep through a liner of known size and permeability rate.
- b. A major consideration in the proposed liner system is that the leak will be repaired within 60 days, thereby reducing the exposure of the clay liner to leakage. We feel that this will be an acceptable proposal as long as provisions are made, such that no leakage will pond on any of the leak detection liners. i.e. provisions will be made to remove any leakage from the leak detection liner. We request that a detailed proposal of how any leakage will be detected, isolated, uncovered and repaired be submitted for review.

These comments should be responded to and/or included in the plans and specifications. One copy of the revised plans should be sent to Mr. David Ariotti, Southeastern District Health Department and two copies to the Bureau of Water Pollution Control for further review.

Please call if there are any questions.

Sincerely,



Charles G. Dietz, P.E.
Environmental Engineer
Bureau of Water Pollution Control

CGD:mw

cc: John Whitehead/Oil, Gas & Mining
Terry McParland/BLM, Moab
Larry Dalton/Wildlife Resources, Price
David Ariotti/Southeastern District Health Dept., Price
Jim Adamson/Southeastern District Health Dept., Moab
Pete Steward/Bureau of Solid & Hazardous Waste